Broadband Optical Variability Processes on Accreting and Non-Accreting T Tauri Stars in the Taurus Star Formation Region

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The broadband optical variability of very young pre-main sequence stars is a combination of both rotationally-modulated periodic signals produced by asymmetric distributions of bright accretion hotspots and dark starspots and accretion-related "flickering" produced by changes in accretion rate and in the magnetic topology of the accretion column on many timescales, which provides a rich source of information on accretion flow and hot-spot conditions and how young stars interact with their disks. K2 can provide a unique set of 2.5 month samplings of this variability by observing a sample of accreting and non-accreting T Tauri stars, but additional contemporaneous ground-based photometry and spectroscopy will be required to interpret and model the K2 light-curves. We propose to observe 20 members of the Taurus star-formation region that fall on active Field 4 silicon. Their Kepler magnitudes cover the range 9-19, but with most brighter than m_Kep=15, and, thus, are well-suited to standard K2 observing methods. Our goal is to obtain a better understanding of the structure and evolution of photospheric magnetic fields on young stars and on the mass accretion process, by studying the time-varying distribution of starspots and hotspots.